

SOIL CONSERVATION

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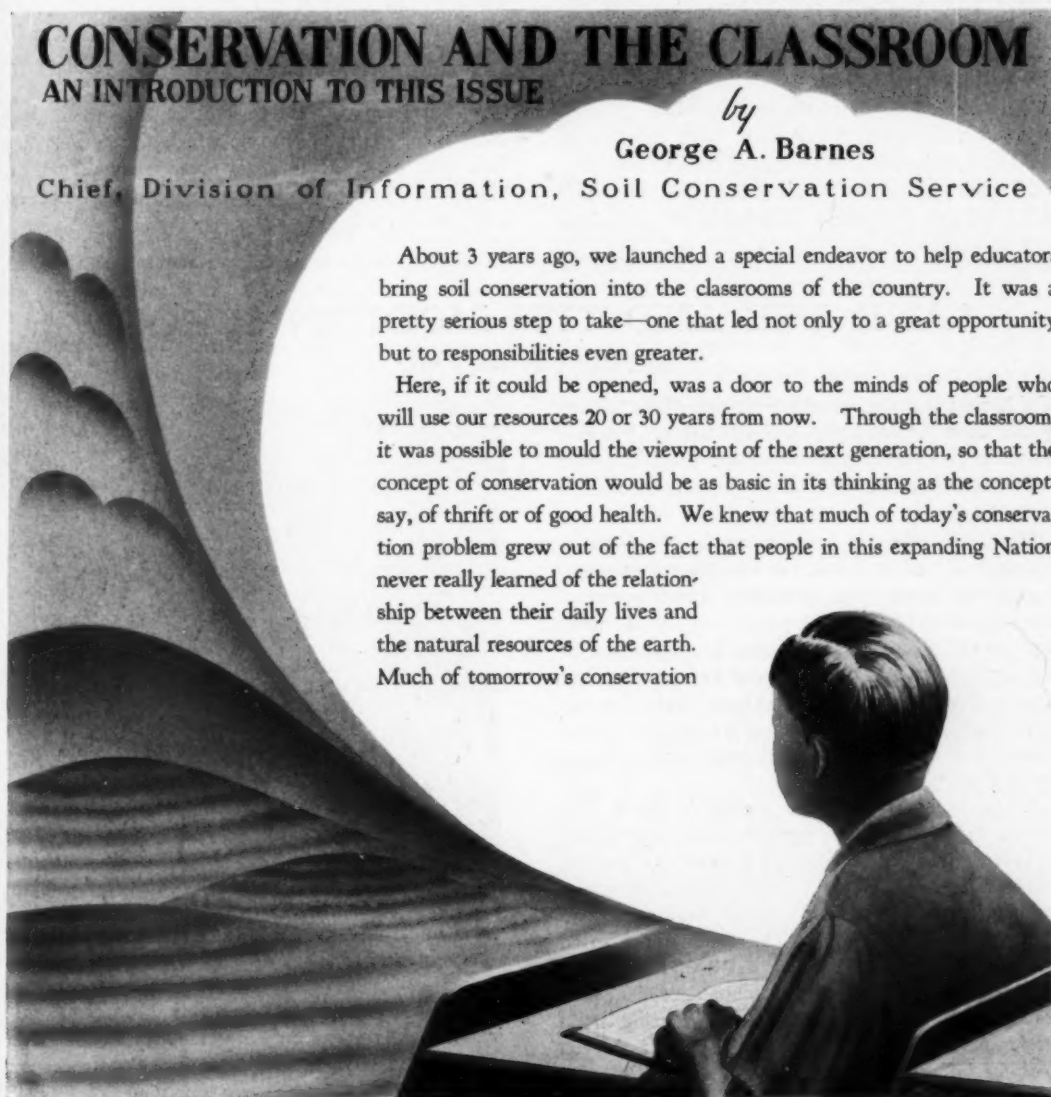
CONSERVATION AND THE CLASSROOM AN INTRODUCTION TO THIS ISSUE

by
George A. Barnes

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About 3 years ago, we launched a special endeavor to help educators bring soil conservation into the classrooms of the country. It was a pretty serious step to take—one that led not only to a great opportunity but to responsibilities even greater.

Here, if it could be opened, was a door to the minds of people who will use our resources 20 or 30 years from now. Through the classroom, it was possible to mould the viewpoint of the next generation, so that the concept of conservation would be as basic in its thinking as the concept, say, of thrift or of good health. We knew that much of today's conservation problem grew out of the fact that people in this expanding Nation never really learned of the relationship between their daily lives and the natural resources of the earth. Much of tomorrow's conservation



problem might be solved, we felt, if the people of tomorrow could be taught that relationship as a part of their basic education.

But if we saw opportunity in the schools, we also saw the grave responsibility involved. An approach to the classroom, we realized, called for great integrity—for the most scrupulous adherence to fact, and the utmost care to avoid anything that might come within the current, noxious connotation of "propaganda." If we were to feed material to the classroom, we felt, we must do so in the best tradition of the teacher and be as alert to misinformation and distorted fact as we were anxious to impart knowledge. We should fail in our responsibility, we clearly saw, if any hint of institutional promotion or indoctrination should enter into what we were doing.

I believe we have borne the responsibility. I know of no instance wherein our work with the schools could be criticised. If we have been at all successful—and I think we have been—it has been due in no small part, I feel sure, to this sense of duty and responsibility.

By and large, educators of the country have welcomed the assistance which the Service has proffered to them. We have provided them with the facts, and they have passed their information along to the children in connection with studies of science, agriculture, social problems, economics, and government. Many have displayed an understanding and enthusiasm that left nothing to be desired. Teachers, apparently, are anxious to teach conservation. They need help with subject matter—suggestions and advice of the kind the Service is in a peculiarly favorable position to give them—but they are becoming our allies in the conservation movement in constantly growing numbers. They will bring conservation to the classroom if we will only help. And of course we will.

In this issue we review some of the outstanding educational developments in which the Service has had some part. There are a great many others, all testifying that the coming generation will not be unaware of its dependence on the soil.

LAND USE AND THE MODERN SCHOOL

By JULIA B. TAPPAN¹

IT IS clear that the immediate problem of the Service lies with the adult population of today. But in a long-time program of soil conservation and land use, this problem becomes the concern of the future citizens of the Nation.

The youth of today faces a complex and difficult economic and social situation in which an understanding of land use is vital. A review of the history of changing education and its parallel to the changing organization of governmental agencies, with some of our methods of approach and our experiences, may serve to show what a great opportunity lies before the Soil Conservation Service and other agencies of the United States Department of Agriculture in relation to the citizens of tomorrow.

A school grows out of the society in which it is found. Early Americans expected their government to protect them against foreign invaders, to provide currency for the exchange of goods, and to meet similar indirect needs. Each family, or at least each community, was self-sustaining. The schools of the period likewise had a limited scope. In 1840, the average person spent only 1½ years in school. Students and teachers were concerned with reading, writing, arithmetic, moral precepts, and discipline—spare the rod



One of our future citizens.

and spoil the child. Children had a functional part in family and community life, receiving much of their education through experience and work in the home and community.

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By 1925 an agrarian society already had become complex, interdependent, industrialized, urban. And a small school of this period was expected to offer about 20 courses in rigidly divided fields of subject matter—courses which had been added to meet first one demand and then another.

It has been apparent for some time that education must be reorganized to meet the broad issues faced by this changing society. Today the new education is concerned with significant controversial problems of our society, such as depressions, unemployment, wars, armament, increased nervous and mental diseases.

The educator of today states that education must be "social engineering, * * * a continuing process of complete socialization." The pupils of more than one high school in different parts of the country, instead of studying subdivisions of traditional subject matter, now study their own centers of interest—the school, home living, the local community, the metropolitan community, conservation of cultural and material resources, our changing methods of production and distribution, governmental and other social agencies in cooperative living, work in relation to everyday living, health, social relationships, use of leisure, economic intelligence, intellectual living, vocation.

The old curriculum of numerous subjects, bulwarked by rigid courses-of-study, is being replaced by the new curriculum: "All the experiences the child has under guidance of the school." These experiences include both those in the controlled environment of the school and those in the community at large. This curriculum is built from two sources: From the social scene and from the characteristics (biological and psychological) of the child. This curriculum is always evolving. It is never the same in any two communities, or in any two classrooms in the same community, or in the same classroom during any 2 years.

To be sure, all this does not mean that teachers and children go ahead without objectives and without goals. There are certain fields of knowledge with which we must be familiar, certain attitudes and modes of behavior necessary for participating in human society. Schools are still places of learning, but true learning requires thinking and participation. In connection with this new curriculum, reading, writing, and arithmetic are as necessary today as they were yesterday.

A pupil learns, however, not by accumulating facts, dates, details, by passing examinations, by mastering the obvious and conforming to the conventional, but by following with the guidance of the teacher the four stages of a typical life experience—purposing, plan-

ning, executing, evaluating. "The living curriculum is one in which teachers and children together are facing situations, solving their problems, building broad understandings of social relationships, and establishing intelligent controls."²

Clearly, conservation and land use have a place in such a scheme of education. The problem is vital to city dwellers as well as to country dwellers, to the whole population as well as to land users. Every community has a direct or indirect land-use problem of its own which logically may be used as a vital starting point for pupils and teachers.

In initiating the program in the field we contacted school systems, teachers, and colleges. It became apparent to us and to the educators that, although natural resources and conservation had been included in courses, there was still much to be done in developing a conservation-minded population, and a population ready and willing to face necessary changes in land use. Certain schools were selected with the advice of the school authorities, and in these teachers and pupils were assisted in developing a meaningful conservation education.

We served as interpreters of the knowledge and the changing experiences of the technical staff of our Service. The teachers with their students were the developers of the curriculum. Just as the Soil Conservation Service began its program by establishing selected demonstration areas, so we selected demonstration areas of education. Just as our land demonstration areas were selected to include various methods and various types of problems, so our education demonstrations were selected to include various aged groups, various methods of teaching, and various geographic areas.

The experiment met with marked interest and led to immediate demands for help, for material, for an expanded program which we were not ready to give until our findings with children and teachers had a longer period of trial.

Certain general procedures and principles were evolved. The land was the textbook. Pupils and teachers used their own community and area. They walked on the land, observed it, learned to recognize the symptoms of misuse, to discover the causes, and to work out for themselves the principles of good land use. In one case a miniature whirl of dust in the schoolyard led to the study of wind erosion and the Dust Bowl. In another, the results of a flash flood and the loss of some valuable irrigated cotton land led

² "Suggestions to Teachers in Guiding Pupil Experience," Pasadena (Calif.) City Schools, 1936.



Sheep are important to this country.

to the study of the watershed, its interrelationships, the delivery of water from the forested area and the rangeland to the irrigated land below.

Basic concepts and bodies of subject matter were needed—an understanding of the water cycle, the behavior of soil and water, the growth of vegetation. These were observed and understood and related to the daily living of human beings. Children gained some understanding of the hydrologic cycle in the simple story of a raindrop. Grass as a necessary food for livestock was known to even the smallest child in the Southwest. How grass grew, how it reproduced, how overgrazing and trampling destroyed it, led quite logically to such statements as, "The cowboys should not let the cattle eat in one place too long." Sustained yield of timber on forest land was expressed as the necessity for large trees, middle-sized trees, and little trees. Human use, human needs, human plans and solutions, were the core of each study.

Children have a way of talking about matters that really interest them. Visits by pupils to demonstration areas have led to visits by parents. Parents have written letters to schools expressing their interest and pleasure upon learning that the children are studying land use. In sections where this type of education was going on, the technical men reported an added

interest in the districts and a great facility in obtaining agreements.

The educational superintendents, supervisors, departments of education lent every facility, advised, took over whenever possible. The technical staff of the Soil Conservation Service conducted tours, learned to adapt their language to children's understanding, frequently wrote for us expositions of difficult or troublesome subjects in lucid, simple language. The material on human surveys, from our section of conservation economics, supplied information about the population, its use of land, its economic and social problems. Teachers, recognizing that soil conservation was of great interest to their community, that it helped in the vitalizing and socializing of the whole school program, threw themselves into the program with originality and eagerness.

Our brief experiment has shown that land planning and use has an immediate interest for every school, and that teachers, pupils, parents, and State officials are eager to have a part in it. It is one of the great problems before us today. It has to do with subsistence, with food, clothing, shelter, with taxes, and with many of the problems which are daily a part of home, community, and Nation.



Sixth-grade pupils studying moisture conservation after a snow.

CONSERVATION EDUCATION IN THE SOUTHEAST

By BERT D. ROBINSON¹



Biology students, Alamance County, N. C., see at first hand how gullies develop in pasture land; learn about conservation measures for preventing them.

TODAY public-school teachers in the Southeastern Region as well as farmers are profoundly concerned about erosion. The farmers, of course, have swung into action. Throughout the Southeast they have cooperated wholeheartedly in the erosion-control demonstration projects set up 5 years ago, and now more and more are participating in the programs of the soil-conservation districts. Over a third of the land area of the region is now within the districts.

Educators have had an opportunity to observe and study the new rural pattern being created in the Southeast by conservation farming. They are now stressing the social and economic significance of soil conservation and in the meantime their influence is permeating downward through the high schools into the grade schools.

The work of teachers in the 10 consolidated schools in Alamance County, N. C., in teaching and studying soil conservation in connection with their various social and physical science courses is noteworthy. Here again, as in many other sections of the Southeast, the teachers do not have to travel far to study erosion and soil conservation. First-hand studies can be made within the community.

The school officials and teachers of Alamance County have kept in close touch with the Stony Creek erosion-control demonstration project which embraces about 18,000 acres and with the Burlington C. C. C. camp demonstration area in the county. Furthermore, the teachers have available for convenient observation an independent agency—a farmer-organized soil-conservation district which is tackling the erosion problem on a much wider scale. Alamance and Guilford Counties form the Haw River soil-conservation district embracing 750,000 acres. A memorandum of understanding between the district supervisors and the Soil Conservation Service for technical assistance in conservation planning was effected early this year.

The emphasis that soil conservation is now receiving in the Alamance County schools is not the result of a sudden recognition of the erosion problem and an immediate resolution to bring it to the attention of the school children. On the other hand, the problem had to be studied, its relation to society determined, and teachers had to familiarize themselves with remedial measures in order to make the subject interesting and understandable to his or her students. With this in mind, M. E. Yount, superintendent of the county schools, consulted Prof. George Beecher of the science department of Elon College which is in the same county, asking for help in developing a practical

¹ Associate information specialist, regional division of Information, Southeastern Region, Soil Conservation Service, Spartanburg, S. C.

system for giving soil conservation proper emphasis in the schools. Professor Beecher now serves as a consultant in curriculum and other educational matters to the county school system.

After considerable research and study, Professor Beecher produced two mimeographed publications for use by the science teachers in the county's schools. One, *Science and Change in Alamance County Life*, is rich in background material for science studies; the other, *Science Studies in Alamance County Schools*, outlines a cooperative program for improving courses in physical and social sciences through use of community and other teaching resources.

These two publications contain among other things a wealth of material on the erosion problem of Alamance County and the conservation program that is under way in the county. Land use in the county is explained from the pioneer days up to the present. In developing this material and in assisting the teachers in Alamance County, Professor Beecher held to the belief that even the complexity of our modern society can be made understandable to the secondary school students.

In the forepart of *Science and Change in Alamance County Life*, Professor Beecher acknowledges that the rapid advancement of science makes it increasingly difficult to teach. Yet, he feels that the problem is not without solution: "Not only have the conditions of living and modern culture been changed and complicated, but the scientific methods of thinking have become swamped with difficulties of language and technicalities. The sciences are outstripping our ability to understand the most commonplace manipulations or devices. But this state of affairs is partly a frame of mind, partly a tendency to leave science to specialists. The method of thinking has not changed. It is still a matter of exact observation, orderly arrangement of facts, and attempts to understand relationships."

More and more teachers in Alamance County are regarding the community as a vast laboratory. Here the student may see society at work. At first glance the community may appear to be a highly complicated structure and baffling to the mind, but probing beneath the surface under the skillful guidance of the teacher the student discovers that the underlying causes and mechanisms are not as complex as they first appeared. As further study is made the picture becomes more and more clear and its realism affords the teacher an opportunity to leave an indelible impression on the mind of the student.

So, for example, when the science teacher in an

Alamance County school takes his biology class on a field trip there is, as Professor Beecher advocates, "exact observation, orderly arrangement of facts, and attempts to understand relationships." If the class is in a woods it may study the decomposition of woods litter and the soil-conserving value of the litter. At the same time students will note the color of surface soil and moisture content for a later comparison with surface soil on eroded cultivated land. This, of course, is only one of the ways in which students in the Alamance secondary schools develop a better appreciation of the erosion problem and the need for soil conservation. At some time or another during the study of other science subjects soil conservation is properly introduced; and, instead of depending entirely on textbook and other written material, the teacher and the class leave the school and use their community as a laboratory.

Thus far, conservation education in the Alamance County secondary schools has been designed mainly for high-school classes. Serious thought is being given however, to the development of a similar approach in the lower grades.

Throughout the Southeast the Soil Conservation Service is frequently consulted on two significant aspects of conservation education—one concerns teaching material and the other school and classroom procedures. During the fiscal year ended June 30, 1940, the regional office at Spartanburg, S. C., received nearly a thousand requests for teaching material. In many instances teachers were supplied with localized material so that they could focus the students' attention more effectively on erosion problems and conservation programs near their homes. The Service does not attempt to develop teaching procedures or methods, as these can best be handled by the teachers and State educational officials. However, the names of teachers who have developed successful methods are suggested as sources of information so that the benefits of their experience may be utilized.

A few years ago college and school libraries in the Southeast had relatively little material on soil conservation, but today many have rather complete collections of books and other publications on the subject. Teacher colleges are placing considerable emphasis on the development of "materials bureaus" for serving not only students in attendance at the college but also public school teachers in nearby communities. The State Teachers College at Troy, Ala., for example, is making a special attempt to acquaint teachers in nearby counties concerning the material available. At an educational conference held



Alamance County pupils examine the decomposition of woods litter and the protection it affords the soil. Also noted are the color and the moisture content of the surface soil as compared with the surface soil of eroding cultivated fields.

at the college during July, considerable emphasis was placed on the need of conservation education in schools. College officials also requested the assistance of technicians of the Service on field trips to erosion-control demonstration areas and soil conservation districts. Assurance that the technicians would gladly help was immediately given by the State coordinator who had been requested to attend the conference and offer suggestions for advancing conservation education.

State coordinators frequently are asked to assist colleges and schools in their conservation courses. This not only calls for appearances in the classroom but on field trips to demonstration areas. When the State coordinator is unable to participate, arrangements are made so that an area technician will be available.

Vocational agriculture teachers in the Southeast have been quick to utilize the erosion-control demonstration projects and soil conservation districts for teaching soil conservation. They are also furnishing

effective assistance to the district supervisors in getting conservation farming practices established through student contacts with farmers in their communities as well as in their adult night classes.

"The district program has given me a basis for teaching vocational agriculture which I never had before," remarked C. C. Reed, vocational teacher in the Sardis community school in the Hart County unit of the Broad River soil conservation district in northern Georgia. "My boys can get more out of seeing good farming practices combined into a unified program on one farm than they could get from a whole textbook of explanation.

Vocational teachers, however, have pointed out the need for a compact publication, for use in the classroom, that contains essential information on soil and moisture conservation and lists of suitable references. They suggested that such a publication be developed on a State basis rather than regional, so that specific

(Continued on p. 95)

NATIONAL RESOURCES AND THE WORK-SHOP IDEA

By HELEN M. STRONG¹

EDUCATION within the past 2 years has taken a most significant step regarding natural resources, based upon the relation of the child or more mature student to the community and the region in which it is located.

When the local community and the home largely were self-contained, through participation in community work, boys and girls attained a consciousness of their intimate dependence upon the community and community resources. Today, the necessities of life come from the store to the home, instead of from field, forest, stream, or mine. Consequently, stores and factories are realities, but their direct dependence upon natural resources often is too little realized.

Paul R. Hanna, professor of education at Stanford University, through studying the role of regionalism and the community in education, became aware of the fundamental influence of natural resources in every region and community. In fact, it is differing combinations of such natural resources as climate, soil, land form, water and mineral resources, native vegetation, native animal life, location, and area that are responsible for the basic regional framework of the United States and other countries. People have developed regional social and economic patterns through use of regional natural resources.

All this brings the educator face to face with the principles and problems expressed in the "Role of Education in Utilizing Regional Resources."² Because leading educators are convinced that sound use of natural and human resources is essential to future well-being in America, they believe that an understanding of this vital relationship must come through education.

Geographers and sociologists have emphasized the significance of the natural region. Harlan H. Barrows, consultant of the National Resources Planning Board, in his presidential address before the Association of American Geographers spoke of regional geography as the "culminating branch of the science." An eminent sociologist and educational leader, Howard W. Odum, in his "Regionalism" has emphasized the human aspects of the region.

Educators have assumed leadership in bringing about an understanding of the interrelationship between

natural and human resources. They have asked subject-matter people, natural and social scientists, to aid them, and have organized the Commission on Education and Resources. It is sponsored by the National Educational Association, the Progressive Education Association, and the United States Office of Education, each of which is represented on its membership. Paul R. Hanna is its chairman.

The commission, with a few invited consultants, met at Reed College in Portland, Oreg., for 10 days early in June 1940. It was my privilege to share in their deliberations as one of the consultants. We considered present educational understandings about resources, as resources are related to the present and future of the United States; the place of resources in education; and the approach to integration of resource teaching into classroom activities from kindergarten through teachers' college and university.

Members of this conference held a deep conviction that the following understandings, fundamental to the Nation's future, must come out of education: That the America of today has evolved out of the human use of natural resources; that human activities and natural resources basically are regional in character; that America must recognize the need for sound practical use of natural resources in the best future interests of the country; that two futures present themselves—one downgrade, the other, upgrade, according to the use made of natural and human resources; that America must act accordingly in using its natural and human resources; and that education is a fundamental factor in achieving an understanding use of natural and human resources.

In order to develop an understanding of all these resource relations to American life the commission believes that these are some of the educational needs: To sensitize teachers to natural and human resources and their relations to life; to provide materials in the way of publications and teaching outlines; to afford in teacher training an understanding of natural and human resources, and of the techniques for relating them to teaching activities.

The commission provides a focus of educational action that will sensitize teachers, educators, children, and adults to their dependence upon natural resources. It will sensitize them to the need for public school and college education to act in order to preserve national

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² Paul R. Hanna and Harold C. Hand, Stanford University, Calif., and the Progressive Education Association, New York, N. Y.

human and natural resources through wise use. Through education it will implement the work being done by private, State, and Federal agencies working toward spread of sound practices in the use of land, minerals, soils and waters, wildlife, forests and grasslands.

The commission has undertaken a fundamental task essential for maintaining the natural and human resource foundation upon which the life of the American Nation depends. It is leading the way for teachers and educators to bridge the gap between an objective knowledge of human problems, of topsoil, minerals, waters, climate, area, regional location, forests and grasslands, and a subjective understanding of their personal relation to every individual and every community. It is pointing the way for teachers to weave these facts into their classroom work. Out of this will come an understanding, from the grades, through the university, that will eventuate in constructive action for sound resource use in the interest of each community, each State, and the Nation as a whole.

This summer the commission centered its efforts on an intensive workshop program in the Pacific Northwest, and less intensive institute and study projects in the Southeast. Syracuse University and the Harvard Graduate School of Education, in their summer workshops, also dealt with regional resources. Key educational leaders limited to 150 in number registered in the workshops at Reed College in Portland, Oreg., and the University of Washington at Seattle. For 6 weeks these leaders worked on projects, outlines, ways and means of weaving resource teaching into areas of human living, and into subjects taught in their school systems. University credit was given for this work.

The staff of the workshops and the commission consultants were routed successively to all the teachers, colleges and schools of education in the Pacific Northwest. For a week at each of these places a resource institute was held, attended by all the classroom teachers registered for summer work. In this way, thousands of classroom teachers heard resource facts presented, and in group or individual discussion grappled with their personal problems of resource teaching.

A similar but less intensive activity in the Southeast included George Peabody College for Teachers, the University of North Carolina, University of Kentucky, University of Tennessee, and the State Teachers College at Troy, Ala. At Peabody, 1,500 teachers and educators attended the curriculum conference where community life in its resource relations—

human and natural—was considered from the point of view of the classroom teacher. For 10 years, Peabody has been holding such conferences annually, and has had a workshop group dealing with curriculum problems. It is significant that here and elsewhere through the South and Southeast, faculty leaders are thinking of the region and its resources as connected with everyday classroom work. Next year workshops in these and other universities plan to work on problems and projects dealing with the place of regional resources in classroom activities and the curriculum as a whole.

CONSERVATION EDUCATION IN THE SOUTHEAST

(Continued from p. 93)

recommendations on conservation practices could be included. Verd Peterson, State supervisor of the division of vocational agriculture and home economics, South Carolina Department of Education, had sensed the need for such a publication for some time and last spring at his request the Soil Conservation Service in cooperation with vocational teachers and specialists of Clemson College prepared the teaching material.

Virtually all phases of soil conservation for South Carolina are covered in the publication. Needless to say the heads of vocational departments of other Southeastern States also are interested in developing a similar type of publication for their teachers. The South Carolina publication will, no doubt, serve as a suitable model for work of this kind.

The results of conservation teaching in the Southeast, as elsewhere, cannot be measured by a yardstick; nor will an imposing array of statistics give a true picture. Moreover, the work that the educators are doing in this field will not produce its maximum benefits until youth reaches manhood and has the full responsibility of safeguarding our land resources. The present job is to make the mind of youth capable of sensing and understanding the full significance of wise land use and that conservation is essential for the future as well as present security of the Nation.

Fortunately, youth in the Southeast has a much better opportunity for studying conservation than the present and preceding generations had. Virtually every land-grant college in the Southeast lists in its curriculum courses on soil conservation. In addition, approximately 25 other colleges offer regular conservation courses in which soil conservation is stressed. These institutions and the public schools constitute a formidable defense against which the forces of erosion can hope to make but little, if any, headway.

THE CURRICULUM AND SOIL CONSERVATION

By CYRIL W. GRACE¹

THE processes exhausting our resources are not ills that may be fixed upon a particular era or administration, but rather the development of a way of life dating from the earliest settlement of this country down to the present. We have now reached that climax from whence we must begin the long process of restoration, conservation, and a continuous practice of thrift if we are to be assured of a continuous democracy. The degree of political democracy, in the final analysis, will be conditioned by economic democracy. The two are inseparable.

It is obvious that the elements of conservation of necessity must be ingrained in the customs of the people. The common school has been the natural institution provided by our democratic form of government to assure the nation of continuous progress. The philosophy of the common school is largely motivated by the teacher-training institution. Preliminary investigation and applications, limited in nature, therefore become necessary in the teacher-training institution before any valid curricular materials or techniques become general practice.

The theory of the Mayville experiment, as the work of this teachers' college has become known, is premised upon a theory of collegiate organization. The essence of the experiment is that a teacher-training institution should be prepared to deal with certain basic problems of the area it serves, and to train the forces of its several departments upon these problems in such a way as to provide for the passive understanding of the adult public as well as for the future general welfare through the education of children. Soil conservation is basic and essential to the general welfare of the agricultural population of this area and it was for this reason that the college was chosen as the starting point for the experiment.

The approaches to the problem have been varied. Throughout the first year of the experiment, the president's weekly convocations dealt with the present economic and social condition of the State and the relationship of these conditions to the exhaustion of natural resources. The convocation lectures served as a point of coordination for the many activities that developed, as well as a process of orientation. From time to time conferences were held with A. W. Emerson of the Soil Conservation Service, in developing plans for discussions in regular classroom work on

the erosion problem and modern methods of conservation.

A conservation committee was appointed from the faculty. This committee was composed of the head of the science department, Dr. Harold Burdick, Miss Ellen Johnson of the rural education department, Prof. Harold Addicott of the geography department, and the president of the college. A coordination of the work of these four departments represents an attainment in itself.

All materials produced by the committee are tested in the training schools affiliated with the college. The results have been most gratifying. Seldom is a visit made to one of the seven affiliated training schools for practice teachers that pupils are not found constructing terraces on mounds of soil carried into the schoolroom in the ashpan or in a discarded dishpan brought from home by one of the children. Strip cropping pictures are being drawn, bird houses constructed, trees planted in the schoolyard, or any one of the many conservation activities of interest to school children may be in process of study. These children are living and enjoying their environment. They are learning the relationship of success in farming to good land-use practices. In addition to the developments of new techniques and materials, new understandings of the problem have developed on the part of the faculty participants.

Other departments are now devoting a portion of their time to this particular problem. For instance, the library, under the direction of Prof. Hazel Byrnes, has developed a unique package library. Books and materials pertaining to the many aspects of conservation are wrapped in packages and called for by teachers who agree to supervise the circulation of materials in the neighborhood of the school, among adults as well as children. When through with a package, this teacher rewraps the books and sends them on to a neighboring school. Ultimately, after the package has visited several communities, the material arrives back at the college and is made ready for another visit.

Prof. Hans Lee, of the music department, encourages classes in composition to develop songs pertaining to many aspects of rural life and to soil conservation.

The art department, under the direction of Prof. Eugene Myers, teaches the teacher, who in turn will teach the rural children, to draw and paint pictures

¹ President, State Teachers College, Mayville, N. Dak.

of their environment as it is, and as it may be. It is interesting to see teachers drawing pictures of contour and strip farming, and then to see the student teachers in our rural schools directing the activities of the children along similar lines.

The extension soil conservationist, in cooperation with the local county agent, the Soil Conservation Service, and local farmers, has established two demonstration farms nearby, for observation by college students and elementary school pupils. It is not uncommon of an evening or late afternoon to see college students on tour, studying the various conservation practices and discussing with the farmer his farm plan and the whys of many of his operations.

Under the direction of Prof. C. O. Mehuse and Frederick Weigle, a public forum committee is developing techniques whereby the young school teacher may learn the processes of engaging the adults of a community in problems of vital interest to them, including soil conservation. We realize that the young teacher, in all probability, will not be able to assume platform leadership; but with patterns and blueprints available, she will know how to develop the innate leadership available and to use it in the development of the community center.

Short courses in the field of conservation are held each year. The United States Department of Agriculture has cooperated during these 2-week periods by sending experts in the various aspects of conservation to the campus to lecture and demonstrate the latest and most approved methods. The Soil Conservation Service has been especially cooperative in this respect by furnishing leadership in the development and guidance of these courses. Student interest has been high. These short courses are taken voluntarily, and offered without credit. At their late afternoon and evening sessions the attendance frequently exceeds 100 students. Inasmuch as freshmen and juniors do not participate, and in view of the fact that our enrollment in this college is about 500, this should indicate how a student body will respond to the needs of their State if emphasis is given in several departments to a particular problem. We also offer a course on conservation for credit during the summer session. Each student, when leaving the college to take up teaching, receives a list of all Soil Conservation Service demonstrations in the area adjacent to the location of the school where she or he will teach; these demonstrations can then be used for observation and as teaching aids. Several other departments offer assistance in this field of interest, but

(Continued on p. 106)



Elementary-school children stop for a discussion of the farm plan with the farmer.

THE LAND AS A TEXTBOOK

By ANNE RAYMOND¹



High-school tour, Mount Chusko, Navajo Reservation. Spanish, Indian, and Anglo students learn the principles of revegetation.



Little children from Tucson, Ariz., know that "grass tucks down land and catches rain."

WE USE a phrase with our teachers and pupils, "The Land is the Textbook," which gives the spirit of our work in the Southwest. Perhaps it was sheer necessity at first because there was little if any written material to help us in our particular situation and we ourselves of necessity had to follow the surveys, the research, the methods which were constantly being developed by the many technical men working with the land and its resources.

We all began in the same way. We walked on the land and studied how nature works; how soil and water behave.

We took this land apart in our thinking. We saw the ways in which living things grew bigger and

better or gradually fewer and smaller and perhaps even disappeared. Our first necessity was a knowledge of certain basic concepts:

1. The water cycle.
2. The "balance of nature," or the interdependence of animals and people, land and water.
3. The growth of a tree: Its parts; its value as vegetative cover.
4. Grass and its contribution as a vegetative cover. (Grass manufactures its food in the leaf or blade and stores its food in the root, stem, and seed; it must have opportunity to grow sufficiently to reproduce.)
5. Ground litter: What it is composed of; its value. (Ground litter increases absorption, slows run-off, filters the rain, decomposes to form nourishment, slows evaporation, etc.)

In our study of the land one of our first approaches to this new knowledge is a careful study of Russell Lord's bulletin, "To Hold This Soil"—the first invertebrates in the sea, and then the succession of vertebrates and amphibians, dinosaurs, and mammals. We are able to go with our yardstick and measure the footprints of the dinosaur that walked in Arizona, New Mexico, Colorado, and Utah. His bones have been dug up by scientists of today and reconstructed to show the skeleton of this huge reptile.

Finally in our picture we see man on the earth. We see him through his period of struggle with the glaciers. We see him traveling with Coronado in

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the Spanish conquest and arriving with the Pilgrims in a boat on the eastern shore of North America. Now at last we are in "today." We have watched the long sequence in nature as it established a certain balance and today, as then, soil and water run to the sea if soil is not tacked down or caught for use. It is an easy transition from this story of the earth in panorama to a journey to the highest spot on our watershed.

From a school in Arizona there comes a picture story, together with reading charts and vocabulary lists of man's travels from the eastern seaboard to the settlement of Arizona. We see him as a Pilgrim clearing the forest, putting in his corn, developing his simple agriculture. Then forced by conditions to move onward and onward, he travels farther and farther west. He settles near a stream in Arizona. We see in the picture story the coming of the stockman with his sheep and his cattle; the gradual loss of vegetation and constant loss of soil. Now we see the man on the land gathered with his neighbors around a big table working out a plan to save the land of Arizona.

Here is the student's problem that gets to the heart of land use:

A man had 120 head of cattle on a section of good grassland. After many years of neglect and erosion he could put only 40 head of cattle on his section. How many acres were needed for each head of stock before the neglect and erosion? How many acres are needed for each head of cattle after many years of neglect and erosion?

Near one school in Arizona a tiny whirlwind of dust gathered force and twirled across the schoolyard. "What is that?" asked the teacher, and the reply came from a small child in the classroom: "Kansas!"

The teacher smiled. "I hardly think it is Kansas, but perhaps we had better go and see for ourselves."

Out they tramped, teacher and children, to find the answer. Other little flurries of wind were carrying dirt hither and yon in tiny twirls and all of it gradually was leaving the schoolyard.

"It's our school ground blowing away," they said. With serious faces they considered this problem.

"Look, Miss D——, it doesn't blow the dirt down there."

Just beyond the schoolyard was a little church and beside the church a fenced-in cemetery. Green grass waved in the breeze.

"Let's go look at it."

So over went the children to the churchyard.



Irrigation, so necessary to their valley, is accorded serious contemplation by these school boys and girls of Santa Fe County, N. Mex.

"Why, it's the grass," they all exclaimed. "Look, Miss D——, the grass has roots in the soil holding the earth like tiny little fingers."

"See," said another, "see the great roots of that tree running down into the earth."

They gathered a handful of grass with the roots intact and tramped once again back to the schoolroom.

Each day was a new adventure of discovery and experiment. They planted seeds in four boxes, two with good soil which they brought from the woods and two with poor soil from nearby. They planted seeds in all four boxes. One good box and one poor one were left without water. They watched day by day to see in which box the seeds grew best.

When I visited the school a few weeks later, this is what I heard: "Seeds need water or they dry up and can't grow—they grow best in good dirt. When they grow into plants, the plant blades catch the rain so that it can run slowly into the soil. The plant roots hold the soil, and everything works together."

They showed me their class readers which they themselves had made day by day. Each child had a book illustrated by himself. The books had four stories based on the fascinating subject of soil and water.

The first story told about the raindrop. The rain-



Third-graders make the study of wheat the basis for a "moving-picture" show.

drop in the ocean was taken up in vapor as the sun warmed the air.

In the second story, the cloud filled with many raindrops reached the cool mountaintop and the vapor turned to water again and fell as rain to the earth. One raindrop fell on trees and grass. It hit the earth lightly and ran down over a leaf, through the twigs, and into the ground. It gave the flowers a drink, the trees a drink, the grass a drink, and then ran out into a cool spring. The children found the spring on a picnic trip and they exclaimed:

"There is that raindrop—it will go down this brook and then to the river and on to the ocean. This raindrop has served everybody and now it will carry food to the fish in the ocean."

The next story was about another raindrop. This raindrop did not fall on the trees and grass. It fell on the earth which was brown with dust. Down the slope it ran gathering other raindrops and soil as it traveled; dirty now, not clear raindrops, and running faster and faster. They tear holes in the land as they run—down to the river and away to the ocean, serving no one and carrying away the farmer's fields, the city streets and highways; back to the sea, filling the fishes' gills with silt, all because there was no grass or trees to catch them.

These little children had simplified the story of Earth's needs: Vegetation to hold the soil and catch the rain; wise land use to maintain the necessary balance between earth and sky and animal and man—basic concepts from a day-by-day study of life and living.

Thus runs the story of one small group who studied soil and water and how they behave. I asked the teacher if it was difficult to develop the story and keep them interested.

"Difficult," she said, "why, they wouldn't let me stop!"

In many high schools of the Southwest, through their land study programs, there grew a simple outline. This covered the virgin land as to topography, geography, water supply, and general balance in nature. Then, man's impact upon nature: His early settlements, influence on vegetation, on water supply, on animals, and a summing up of the results of this use of the land.

This was followed by suggestions for developing a land-use program—appraisals, watershed planning, uses of water, study of importance of vegetation, city planning, etc. Certain methods were suggested for developing the study through maps, graphs, photographs, lantern slides, work sheets, etc. The outline ended with recommendations as set up by the student group.

In this subject of conservation—of man and man's resources—I believe the most important thing is for us to set up a few simple concepts which become clearer to us day by day. They will become clear as we use them, talk about them, find evidence to substantiate them, and at no time will we feel that we have completed them. Experts on any one of these simple subjects are making life studies; today they have reached only milestones, not a finished goal. The water cycle, the growth of trees and grass, ground litter, a watershed, the behavior of soil and water, these are basic understandings which every teacher will have to take as her first objective.

At the close of the program, each teacher should feel much better equipped to go back to the land with a new delight for another year of new discoveries. It is important that there be no such feeling as expressed by one teacher, "I taught that last year." It would be as inconsistent as to say that the grass grew last year so we do not need it this year. There is new knowledge and more adventure forever and forever in the study of this world about us and it is important that we feel ourselves on a journey rather than on a trip.

In 1939 a cooperative summer school devoted entirely to the teaching of conservation and school-community relationships was set up at Norris, Tenn., in cooperation with the University of Tennessee. In 1940 the Norris Summer School was continued, and other activities were enlarged to include intensive work during the regular school year in selected counties where the educational authorities and teachers have manifested a desire to emphasize conservation.

SOIL CONSERVATION IN ELEMENTARY AND SECONDARY SCHOOLS

By TOM DALE¹

A FEW weeks ago I attended a class in curriculum building for secondary schools at the Kansas State Teachers College at Emporia. Ten teachers and principals from Kansas high schools were enrolled as graduate students. Dr. H. G. Lull, head of the department of education at that institution, was the instructor. As he called the roll, he asked each student to explain the work he was doing.

The first student said that he was making a study of the social aspects of accelerated soil erosion in the United States—seeking information as to the effects of soil wastage on the standard of living in the communities and homes affected; acquiring facts about the effects of erosion on the industrial, economic, and social life of the Nation, the State, and community. But he was carrying his plan of study further still: As soon as he was satisfied that he had correct information about these problems, he hoped to devise methods of integrating it into the high school curriculum. It was his opinion that such information should be emphasized to a greater extent in the social studies, in American history, and in the social sciences of the Kansas secondary schools. He expected to make specific recommendations as to when and how this material might be introduced into these high-school classes.

Another student was studying the history of soil erosion and conservation in foreign countries and attempting to integrate his findings into the studies of world history and other subjects taught in Kansas high schools. Still another student was trying to decide what the physics and chemistry instructors should teach about the mechanics of soil erosion and commonly used conservation practices.

As the roll call was completed it became evident that each of the 10 students was making a study of a different phase of the soil erosion and soil and water conservation problems and was attempting to make specific recommendations as to how these subjects might be given their proper place and emphasis in the teaching program of the secondary schools. The class was meeting for an 8-weeks' period, and approximately one-half of the time was devoted to these land-use studies. The balance of the time was taken up with similar curriculum building activities on the conservation of human resources and the other natural

resources of this prairie State. It was very interesting, and I felt that this small class might be doing a piece of work that will have national significance.

A 5-day conference on curriculum building was held during this same summer session of the teachers college at Emporia. Some 300 school teachers attended the conference. During the first 2 days, general problems of curriculum building were discussed. Particularly interesting was a discussion on the need for building a school curriculum to fit the aptitudes and characteristics of the pupils, and around problems of the homes and community.

The last 3 days of the conference were devoted largely to a study of land use and conservation problems of the State and the need for further emphasis on these vital matters in the elementary and secondary school curricula. A field trip to study the land and see erosion control practices at first hand was a feature of the conference. Dr. Lull declared that this curriculum conference was but a beginning of the efforts of his teachers training department to inject into the elementary and secondary school curricula a more complete and balanced study of Kansas resources and their conservation.

In 1940, for the second consecutive year, the West Texas State College at Canyon made a 6-weeks' course on the conservation of natural resources a special feature of its summer session. This year about 90 teachers were enrolled. Approximately one-half of the time was devoted to the study of better land use and soil and water conservation. The objective of these courses is to stimulate the teaching of conservation in the public schools.

At Boulder, Colo., the dean of the extension service of the State University decided last winter that the problem of soil erosion control was more than an agricultural problem in his State. He requested the Soil Conservation Service to cooperate with his institution in holding a 3-day special conference for summer school students on the subject "Conquering the Dust Bowl." The geography, geology, biology, education, sociology, and other departments of the university helped to make the conference a success. The Chief of the Soil Conservation Service appeared as the principal speaker and other addresses were made by regional leaders in the conservation movement from this Service, the Forest Service, and the faculty of the university.

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The authorities at the university were so pleased with the reception of this initial effort that they are laying plans for a similar conference on a broader subject next year.

Faculty members of the State Teachers College at Greeley, Colo., in their efforts to emphasize the conservation of resources in curriculum building, called on the Soil Conservation Service for assistance. A speaker from the Service explained the soil erosion problem and its solution to several groups of teachers attending the summer school. His remarks met with an enthusiastic reception, and many seemed suddenly to realize that they had not given these matters the emphasis deserved in their curriculum building work of the past.

These are but a few of the teachers colleges, universities, and other nonagricultural colleges that have become actively interested in conservation education.

Public-school administrators and teachers in all regions seem to be thinking on these vital problems and, certainly, this attitude indicates a trend. How many teachers are keeping pace with the trend? If we are to build a firm foundation, conservation education must be universal. The development of habits of thinking among the citizenship, to the end that conservation will become a fundamental policy of the State and individual, should be the ultimate objective.

People usually think according to habits acquired over a period of time. In a country whose present generation has seen many fortunes made by the exploitation of natural resources, and where the majority have at some time profited from such exploitation, thinking in terms of conserving these resources cannot be the general rule until public attitudes change. The elementary and secondary schools seem a logical place to start bringing about this change.

SCHOOLS TEACH LESSONS FROM THE LAND

By WALTER W. JOHN¹

FARMS and forests are becoming conservation classrooms for schools in the Upper Mississippi Region. The demand for soil conservation educational material is one of the best indications that teachers are using lessons from the land for classroom instruction. Teachers welcome up-to-date material on conservation. Thousands of soil conservation publications have been placed in the schools of Illinois, Iowa, Minnesota, Missouri, and Wisconsin within the last year. These publications were obtained from exhibits at education meetings, through mailing lists, and by direct request. The regional office filled more than 1,500 written requests from teachers for bulletins and visual aids during that period. About half of the requests were received at exhibits during education conventions.

Soil conservation exhibits and publications were displayed in this region during the last year at the national conventions of the National Education Association, Progressive Education Association, Association for Childhood Education, and Central Association for Science and Mathematics Teachers. The Service also participated in annual teachers' conventions in three States and in a number of district conventions and county institutes.

Nearly all of the 34 teachers colleges in the region are offering courses in conservation and are using soil conservation publications and visual aids in these and

related courses. They are supplementing their conservation instruction with field trips where students gain first-hand information on the condition of natural resources and methods of proper use and protection.

The field study has just been mentioned as one teaching supplement; it is perhaps the most fundamental aid to instruction in any conservation course. It utilizes the farms and forests as classrooms. Louis Agassiz, noted naturalist and early conservationist, said, "Study nature, not books." Teachers today find that they can get best results by studying both nature and books. The many recent publications on soil conservation serve to point the student's attention to the actual source of information—the land itself.

Visual aids unquestionably have the greatest appeal to the student and at the same time tell the story of conservation effectively. Included in this category are movies, lantern slides, charts, exhibits, photographs, film strips, and special display material.

The universal appeal of soil conservation to all ages and groups of people is typified by the excellent reception of the movie "Once Upon A Time," written by J. N. "Ding" Darling and produced by the North American Wildlife Federation. Simple enough to be partly understood and thoroughly enjoyed by all school children, it also carries a powerful message to the grown-up, whether he is a teacher or a technician. "The River," filmed by Pare Lorentz, is a masterly production that reaches the heart of the problem and

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awakens the public mind to the task of conservation. Both of these movies and many others have been widely used in classes ranging from the third grade to the twelfth and for adults generally.

The Soil Conservation Service maintains a supply of suitable movies, colored lantern slides, film strips, and exhibit material for loan to schools and educational groups. Charts and many publications are available to teachers and libraries without cost.

Children have always enjoyed studying about trees, birds, flowers, and animals, but until recently the soil has been a mystery locked beneath Nature's blanket of growing things. The young mind is fascinated by teaching processes that reveal this mystery as a natural process from which most life springs. It may be difficult for the third-grader to comprehend the meaning of topsoil and its full value, but a brief study of an eroded field, a roadbank, or other exposed soil profile easily explains it to him. By the time he reaches the eighth grade he will be able to grasp the meaning of soil conservation, whether he lives in the country or in the city. Soil conservation has many stories that can be told in a fascinating way. Movies, colored slides, and classroom drawings add immeasurably to children's interest in the subject. Sand tables and model farms are excellent aids to instruction. Field studies, which are being used by many teachers, are recommended as of first importance.

To obtain proper recognition of conservation, State departments of education and teachers organizations are issuing special curricular material on this subject for public-school teachers. Two States in the region have revised their curricula to include conservation outlines in their course of study. The other three States have prepared supplementary publications on conservation which teachers may adapt for classroom use.

Soil conservation should not necessarily be studied as a separate course. It is closely related to other subjects taught in public schools and teachers find that it can be taught best in conjunction with these courses. For example, students of biology and other natural sciences concentrate on the study of life in man, plants, and animals and the processes by which it develops. Since the soil nurtures life, a study of biology is not complete unless it shows the natural relationships that exist among man, plants, animals, and soil and the necessity of conservation of soil for the benefit of the other three.

Geography, the science of the earth and its life, is particularly well adapted for the inclusion of soil conservation. Any study of geography should correlate

the effects of climate, water, vegetation, and man's activities on the soil.

The map is one of the most essential visual aids used in geography. Today, new maps are making the study of soil conservation easier for the geographer. Soil conservationists are preparing maps to show what erosion has done to the soil and how it can be controlled. Geography teachers are making use of these maps and preparing others in their classes as an effective method of teaching conservation to their students.

Social sciences discuss the social ills that result from impoverishment of the land. Teachers of sociology courses encourage their classes to trace the sociological effects of land decline on both rural and urban communities. Students of government find particularly interesting the new types of local public agencies, such as soil conservation districts, that have been developed especially to protect soil resources.

In agriculture courses students are trained for action in soil conservation. They are taught the practices necessary to conserve the soil and how to apply them. This is especially true in vocational agricultural classes where farm boys are including soil conservation practices among their work projects.

Even in courses in arithmetic, art, history, and other subjects, soil conservation is receiving attention. Experiment-station data and erosion-reconnaissance figures provide problems in arithmetic; a strip-cropped field is a fit subject for a painting; and the historian cannot overlook soil erosion as a factor in the downfall of nations.

The educational service of the Tennessee Department of Conservation began in 1937 to stimulate preparation for better teaching of conservation through conferences, illustrated lectures at teachers' meetings and institutes, field trips and demonstrations, and by distribution of a magazine published by the department and free to every school in the State. Now, according to James L. Bailey, educational assistant for the department, every teacher-training school in the State, with one exception, has added conservation to its curriculum. The subject is taught in such a way that teachers and student teachers learn to interpret the need and means of conservation in the light of problems real to the localities in which they work, and also those which are the concern of the State, region, and the Nation.—F. E. Charles.

TAR HOLLOW CONSERVATION-TEACHING LABORATORY

By F. E. CHARLES¹

WITH arrangements made for teachers, or undergraduate teacher-trainees, to obtain full collegiate credit for their work, the conservation-teaching laboratory was held in the Tar Hollow group camp deep in the hills of Ross-Hocking State Forest in Ohio, an 18,000-acre land-utilization development. At the outset of the 5 weeks' course, each student was given a 2-acre tract for study. Working in pairs, if they preferred, students studied their plots in minutest detail. They mapped them for elevation, cover, vegetation, soil type, bird, and animal life. They brushed away leaf litter under the trees, examined the soil with its myriad of life processes. They charted the habitats of birds and mammals.

After a visit to the Tar Hollow camp, Dr. Frank Thone made the following remarks: "Most particularly have I been impressed with the study-plot program, including as it does all ecological activities and events in the areas under observation. All ecologists whom I know were trained specifically in only one part of the field: They are either plant ecologists, or animal (i. e., mammalian) ecologists, or insect ecologists, etc. That is, they are fractional ecologists, incomplete ecologists. A student who has worked

by the plot method employed here becomes an ecologist of the whole biota, a total and complete ecologist. For the good of ecology I hope the method will spread."

This plot work progressed daily for 5 weeks. When not "plotting," the enrollees studied with the faculty—Dr. Dwight Moore, plant ecologist; Dr. Lawrence Hicks, animal ecologist; Prof. C. F. Moses, geologist; Dr. A. C. Bunce, economist and sociologist; or their Tar Hollow university "chancellor," O. E. Fink, director of the laboratory, brought in such lecturers and conservation-teaching pioneers as Dr. Paul B. Sears who wrote "Deserts on the March"; Dr. J. Russell Smith of Columbia University; Dr. Willis Sutton, superintendent of the Atlanta, Ga., schools; Dr. O. E. Baker of the United States Department of Agriculture; Dr. Frank Thone, editor in biology for *Science Service*.

There were many other visiting speakers, including practical farm planners of the Soil Conservation Service, whose discussions were combined with a tour in a soil conservation C. C. C. camp truck to the nearby Chillicothe camp area. Here each student, faculty member, and visitor studied land-use and conservation-farming maps. They walked across each field, rationalizing field arrangement with the plan adopted.

(Continued on p. 106)



Instructor Arthur Harper identifies a plant species along the nature trail.

SUMMER PLANNING FOR WINTER STUDIES

By FRANK B. HARPER¹ and C. C. JOHNSON²

SOIL conservation was high on the list of subjects considered this past summer in the two education workshops of the Pacific Northwest. The workshops were held during the summer period, one at the University of Washington summer school at Seattle, and the other at Reed College in Portland, Oreg. Both of these curriculum-revision studies were sponsored by the Northwest Regional Council and the Commission on Resources and Education. Soil Conservation Service participation was arranged through Service representatives and Dr. K. O. Warner, director of the Northwest Regional Council, who invited the Service to join with other sources of technical authority to work with the teachers in their search for ways of incorporating natural-resources and other vital every-day subject matter into the school curriculum at various educational levels.

When, near the middle of June, approximately 150 of the educators went to work at Seattle and Portland, the Service was prepared to supply them with the essential facts on the subject of land and its use. During the month-long workshops, this assistance included talks and personal consultation with the workshop groups by the regional educational relations representative, and special discussions given by Dr. Helen Strong, Miss Julia B. Tappan, Miss Anne Raymond, and educational relations representatives of the Albuquerque office of the Soil Conservation Service. Bulletins and other reference material were supplied, and pictorial exhibits were set up at each workshop.

The workshop students made several planned tours to study in the field the subject matter with which they worked in general sessions and group panel meetings. Two of these tours, under the direction of Joseph T. Hazard of the Seattle schools faculty, were to Soil Conservation Service C. C. C. camp areas.

The greater number of the 100 University of Washington workshop members spent a day on the Snohomish camp area, where both men and women teachers explored fields and pastures, streambanks and woodlands, and learned from cooperating farmers and Service technicians how they go about the developing of farming, forestry, and other land-use practices.

A similar week-end excursion took the half-a-hundred Reed College workshop teachers to the camp at Warrenton, where they saw the successful sand dune erosion-control work along the north Oregon coast and also learned about streambank erosion control, seeding of cut-over timberland and other soil- and moisture-saving operations.

If the 1940 workshops appear to be of sufficient value to warrant broadening the experiment into a regular program, it is planned to have similar workshops in the future in every section of the Northwest. The hard work and enthusiastic comments of this year's participants indicate that this plan will be carried out. They were in agreement with the thought behind the workshops—that the misuse and exploitation of natural resources is due largely to a lack of appreciation of their importance, and that the schools have the big share of responsibility in developing such an understanding among today's pupils who will be tomorrow's agricultural and business leaders.

Washington, Oregon, Idaho, Montana, and even British Columbia, were among the areas represented in the first two Northwest workshops. The groups included teachers in all grades, county superintendents, principals and special teachers, taking part as delegates appointed by the schools they represented. After the workshops were over, they returned to their home schools and presented the carefully worked-out curriculum plans and suggestions to the various school groups concerned, for their final criticism and use.

The workshop plan differs from the usual method of conducting a school, in that there is a minimum of lecture work and a maximum of guidance of working groups or committees. In short, it is the laboratory method of curriculum building instead of the old lecture and assignment method. At Reed College, for example, there were seven such committees, each with a leader—science, languages and arts, social studies, Northwest resources, the elementary field, guidance, and materials.

Representatives of different State, Federal and other agencies dealing with natural resources were called by the workshops for consultation—this on the theory that even though many studies containing a wealth of information have been made by these information sources, they have not been widely read in the past. In addition to land resources, the first summer's

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curriculum studies included forestry, fisheries, minerals, water, industry, power, population, and culture, from both a regional and a national point of view.

Dr. Edgar M. Draper, head of the department of education at the University of Washington, was in charge of the workshop at Seattle. The Reed College workshop at Portland was directed by Virgil W. Smith, principal of the Seattle schools. Dr. Draper defined the workshop movement in this way:

"The workshop is an attempt to tie up the curriculum with practical undertakings and technical services. It is our intent to vitalize our courses by taking out some of the dead wood and putting in living phases of the country's activities, based on actual resources."

The Soil Conservation Service took active part during the summer in response to requests to present soil conservation information to seven college summer-school institute groups. Similar but less intensive consideration was given this and allied natural resources subjects by the several hundred teachers and educators attending. The 2- and 3-day institutes were at the University of Idaho, Moscow; State College of Washington, Pullman; Eastern Washington College of Education, Cheney; Central Washington College of Education, Ellensburg; Western Washington College of Education, Bellingham; University of Oregon, Eugene; and Oregon State College, Corvallis.

CURRICULUM AND SOIL CONSERVATION

(Continued from p. 97)

perhaps this probably is sufficient to enable the reader to grasp the meaning and nature of the experiment that has been in progress.

The attention of the Nation is now focussed on national defense. We have firmly rededicated ourselves to the problem of preserving, for ourselves and posterity, the heritage of democracy. We should not lose sight of the fact that the roots of democracy are in the soil; and that the spiritual strength of a strong agrarian commonwealth will ensure us our democracy. To safeguard for the Nation a hardy rural life, and hence democracy, education must devote itself increasingly to the development of the rural community. Curricular materials must not educate the child entirely away from his environment, but must prepare a fair percentage of rural youth for rural living.

General trends of the curriculums of our schools, from the grade school through college, can be advantageous or dangerous to our national welfare and will affect democracy correspondingly. Any curriculum that fails to develop love of home, love of farm or

village or community, and which largely develops dissatisfaction with the home environment, is dangerous to national welfare.

The only really scientific measurement of the curriculum is time. Such a measurement is a matter that concerns each individual citizen in a democracy. The effectiveness of the curriculums in the development of rural life during the past 20 years cannot be discussed here. However, it may be of interest to readers of this article to know that patrons who have read such of our bulletins as *The New School and Its Teacher*, *Experimenting With Soils*, and *Youth and the Soil*, compiled and published cooperatively by our college, the Soil Conservation Service, and the North Dakota Extension Service, have told us that these are the subjects they have wanted in their schools for years but have been unable to attain. Perhaps we should remember that in a democracy, in the final analysis, those who support the schools are entitled to have, and will have, that which they desire.

TAR HOLLOW LABORATORY

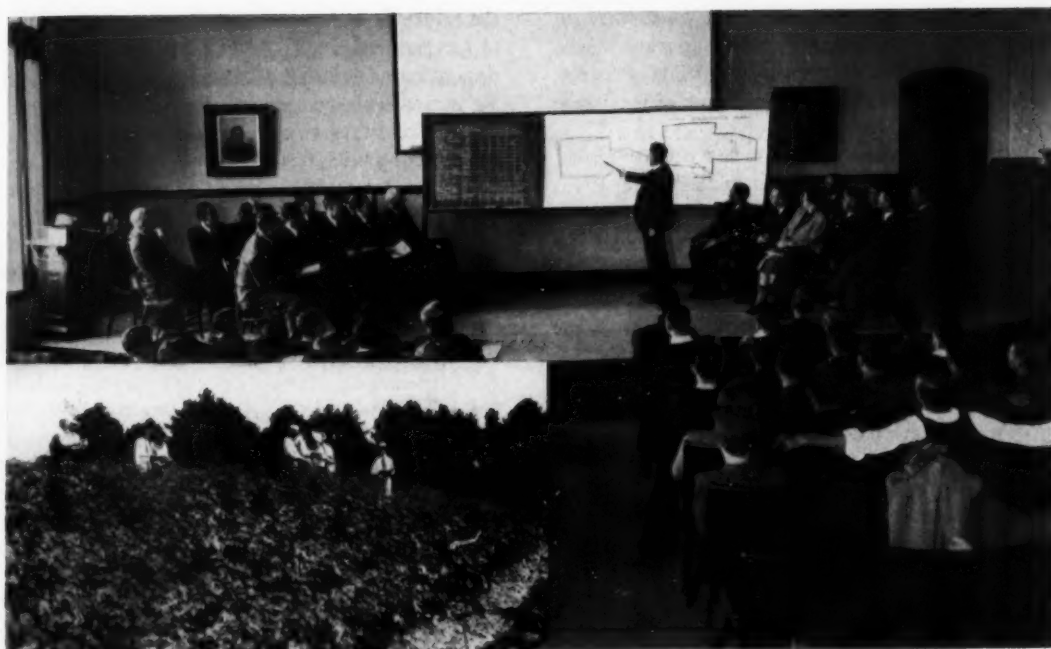
(Continued from p. 104)

A functional approach was made to the landscape and its land-use and social and economic problems. Some of the teacher-trainees possessed a science background, but among the 50 or more in attendance were kindergarten teachers and public-school nurses. These people could learn and enjoy their experience because the aim was an understanding of the interrelation of soils, plants, animals, man, and environment.

How far-reaching was this school? What dividends will it pay?

If you ask the teachers themselves, not one will deny that he is better prepared to explain the intricate relationships involved in any program of conservation—whether, next September, his pupils are first-graders or high-school seniors. These teachers saw things and learned to understand things that they have been stepping on all their lives, without ever seeing.

Instead of 50 more people who now have a better understanding of conservation, we shall have a thousand because each teacher will reach a score of youngsters, and then another score, and then another. The program is a practical, educational-demonstrational program for farmers, bolstered by technical research. But it is more. It must be a public-education program, so that the merchant, the banker, and the manufacturer all learn the meaning of soil conservation. One of the quickest ways to achieve this goal is to teach the banker's little girl and the manufacturer's growing son.



Panel discussion, University of Georgia. Technicians and trainees replan a farm. (Inset) Studying a steep area, now cultivated, that should be retired to perennial vegetation for hay.

A NEW APPROACH TO TRAINING LEADERS IN FARM PLANNING

By O. C. ADERHOLD ¹

"I BELIEVE that the new approach to training leaders in farm planning inaugurated in this State is the beginning of a new procedure that will be most effective in coordinating the activities of agricultural education and will be used as a permanent and State-wide policy," said Paul W. Chapman, dean of the College of Agriculture of the University of Georgia. Dean Chapman made the above statement at the conclusion of a special course in farm planning designed to meet the needs of teachers of vocational agriculture, county agents, and Soil Conservation Service technicians.

One of the most important problems facing all workers in the field of agriculture is that of helping farmers to do a sound job of farm planning. Since more than one agricultural agency may work with the individual farmer and the farmer group, it is essential that the efforts of all agencies be coordinated in order

to prevent overlapping of effort and useless duplication; but more important, it is essential that the efforts of these several agencies result in helping the farmer in formulating a better and sounder farm plan. The coming of the national soil conservation program has placed emphasis upon the need for better-trained personnel and the need for coordinated effort in helping farmers to replan their farms.

In Georgia the Agricultural Extension Service, the Division of Vocational Education, State Department of Education, and the Soil Conservation Service have been requested by the supervisors of the several soil conservation districts in the State to participate in a program of formulating farm plans with special reference to the conservation of soil and water. Since a cooperative plan has been developed which makes it possible for county agents, teachers of vocational agriculture, soil conservation technicians and others to work together in helping farmers to set up farming programs, it is necessary that workers in these fields

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have specific training in the abilities necessary to assist at certain places and in certain ways in the formulation of these programs. The points of cooperation are specifically stated in the work plan of these several districts.

One of the specific problems that county agents, teachers of vocational agriculture, and soil conservation technicians have agreed they will help the farmer to solve is that of setting up his program in the light of the human, soil, and other natural resources on the farm. If these workers are to help the farmer in this direction they need specific preparation to do the job.

In view of the above needs, the Agricultural Extension Service, the Division of Vocational Education, State Department of Education, and the Soil Conservation Service have requested the Division of Teacher-Training in Vocational Education, College of Education, to organize, through the College of Agriculture of the University, a course to develop the needed abilities on the part of the agricultural workers in these three fields. The training program outlined below has been developed.

Training Plan

The college of agriculture made available its entire technical staff, and in cooperation with experts in the Soil Conservation Service, the school of forestry of the university, the Extension Service, State experiment stations, the State forestry service, the Farm Security Administration, vocational education leaders, and the Agricultural Adjustment Administration, is providing technical service for the training course.

The college of agriculture provides:

a. Instructors to teach county agents, teachers of agriculture, and soil conservation technicians to understand and interpret basic farm data. Approximately 1 day is spent with the trainees in the soil conservation district, or in a specified area, in analyzing and interpreting the social, economic, and farm data on two selected farms. The farm management and soils specialists give instructions to the workers in dealing with these basic data.

b. A staff of specialists in the several fields of agriculture to participate in a panel and to assist in formulating two farm programs. Approximately 1 day is devoted to the planning of each farm. The panel procedure is used and trainees are allowed to participate freely in the discussion. The first purpose of the panel is to bring the workers up to date in all fields of agricultural information and to use these data in making specific farm plans. In other words, it is the purpose here to integrate the best information from

the fields of agricultural knowledge into the planning of specific farm programs. The second purpose is to demonstrate an educational method that may be used by agricultural workers in cooperation with technicians, local experts, and selected farmers in a community in planning farm programs.

c. A teaching staff composed of the following specialists:

1. Animal Husbandry:
 - M. P. Jarnagin, head of the department of animal husbandry, University of Georgia.
 - B. L. Southwell, State experiment station, Tifton, Ga.
 2. Agricultural Engineering:
 - J. D. Clement, area agricultural engineer, Soil Conservation Service.
 - W. E. Hudson, instructor in agricultural engineering, University of Georgia.
 3. Soils:
 - W. O. Collins, acting head of the department of agronomy and professor of soils, University of Georgia.
 - C. B. Gay, area soil technician, Soil Conservation Service.
 4. Crops:
 - J. E. Pollock, area agronomist, Soil Conservation Service.
 - C. C. Murray, assistant professor of agronomy, University of Georgia.
 - E. D. Alexander, agronomist, Agricultural Extension Service, Athens, Ga.
 - George W. Dickinson, regional officer, Soil Conservation Service.
 5. Farm Management:
 - J. W. Firor, head of the department of agricultural economics and rural sociology, University of Georgia.
 - Frank P. King, associate professor of agricultural economics and rural sociology, University of Georgia.
 - J. W. Fanning, Agricultural Extension Service, Athens, Ga.
 - A. O. Duncan, College of Education, Athens, Ga.
 6. Forestry:
 - A. D. McKellar, assistant professor of forestry, University of Georgia.
 - C. B. Beale, area forester, Soil Conservation Service.
 7. Horticulture:
 - T. H. McHatton, head of the horticultural department, University of Georgia.
 8. Poultry:
 - J. C. Bell, assistant professor of poultry husbandry, University of Georgia.
 9. Homemaking:
 - Alice Beall, associate professor of home economics education, University of Georgia.
 - Susan Mathews, home economist, Agricultural Extension Service, Athens, Ga.
 10. Conservationist:
 - R. L. Dolvin, Soil Conservation Service, Athens, Ga.
 11. Agricultural Adjustment Administration:
 - R. R. Childs, assistant field officer, A. A. A.
 12. Farmer:
 - C. E. Fleeman, Jr.
- Director of the Course:
O. C. Aderhold, professor of vocational education, College of Education, University of Georgia, Athens, Ga.

Procedure

The many people involved in the undertaking made it necessary to develop a definite plan of procedure. Below is an example of the procedure for one of the in-service training programs:

1. Representatives of the Agricultural Extension Service, Division of Vocational Education, and the Soil Conservation Service in cooperation with certain county agents, teachers of agriculture, and technicians selected the two farms to be studied and replanned in the training course.

2. The Soil Conservation Service provided comprehensive data on the soil and other resources on the selected farms. They made a soils-resource map for each of the farms and provided copies of these maps for all the members of the faculty and trainees in the course. The maps show soil type, percent of slope, degree of erosion, and land use.

3. Selected teachers of agriculture procured the social and economic data on the two farms, and the Division of Vocational Education duplicated these surveys and provided each member of the staff and each trainee with a copy. The surveys provided data about the family, the home, general farm information, scope and production and value of enterprises, crop and livestock practices, farm expenses, and financial statement.

4. The members of the staff visited each of the selected farms and, with the soils, economic, and social data in hand, studied the farms first-hand.

5. Copies of the social and economic data, along with the soils map, were placed in the hands of all trainees, and the two farms were visited and studied. Approximately one-half day was spent on each farm.

6. The farm-management instructor met with the trainees and together they spent a minimum of one-half day studying the economic and social data gathered from the selected farms.

7. The soils specialist spent a minimum of one-half day with the trainees studying the soils and other natural resources of the selected farms—reading maps, field lay-out, etc.

8. The entire staff and the farmer assembled and, through the use of the panel and conference procedure, replanned each of the farms. Approximately 1 day was devoted to setting up a plan for each of the farms. The panel procedure was to take the aspects of farm planning as listed below and through discussions to find a solution for each of the problems. The solution found was the result of careful consideration and evaluation of facts and opinions presented by the members of the staff and the farmer. In most

instances the group reached a unanimous decision about the several aspects of the farm plan. The following general procedure was used in setting up each of the farms:

- a. Setting up the type of farming for the farm.
- b. Setting up the food and feed program for the farm.
- c. Setting up the livestock program on the farm.
- d. Setting up the cropping program on the farm.
- e. Setting up the forestry program on the farm.
- f. Setting up a wildlife program on the farm.
- g. Setting up a rotation system to practice on the farm.
- h. Setting up a water-disposal system for the farm.
- i. Setting up certain farm practices such as:
 - (1) Terracing practice.
 - (2) Meadow stripping.
 - (3) Sanitation practices.
 - (4) Home conveniences.
 - (5) Others.

9. The soil conservationist spent a minimum of one-half day with the trainees in writing up plans and agreements for the replanned farms. These agreements are in line with the basic requirements of the work plan for the district.

10. The technical staff of the Soil Conservation Service directed the trainees in a comprehensive study of the soil-conservation practices now being carried out on certain soil-conservation demonstration areas. Two days were devoted to a study of these practices.

11. Representatives of the Agricultural Extension Service, of Vocational Education, and of the Soil Conservation Service spent a minimum of one-half day with the trainees in planning methods and techniques for giving instruction to individual farmers and to groups of farmers in farm planning.

Results of Training Course

The training program for in-service groups has reached approximately three-fifths of the teachers of vocational agriculture in the State and many county agents and soil technicians. The teachers working with the Soil Conservation Service have made real progress in farm planning. For example, during the first 6 months following a training course in the Broad River area the teachers planned 132 farms or an average of over 5 farms per teacher. Each of these farm plans is for 5 years and involves many changes in farm practice and farm organization.

A member of the Soil Conservation Service said: "We have real soil conservation programs going in counties where representatives of all three agencies have participated in the training course."

Pre-Service Training Program

If training to deal with this special problem of farm planning is necessary for in-service workers in agriculture, it is even more necessary that such a training

program be provided for pre-service agricultural workers. Those responsible for training teachers of vocational agriculture in Georgia have through the College of Agriculture provided such a training program for pre-service teachers.

The training program for prospective teachers is essentially the same as for the in-service group. The major differences are:

1. The courses are planned specifically for prospective teachers of agriculture; the in-service courses are planned for teachers, county agents, and soil technicians.
2. The staff is largely composed of members of the faculty of the College of Agriculture.
3. The group of prospective teachers participates in the planning of only one farm, whereas the in-service groups plan from two to four farms.
4. The follow-up work with trainees in new practices such as strip cropping is done by members of the college staff, whereas for the in-service group this is done by the Soil Conservation Service.

The reaction of the technical staff and the trainees

to both the pre-service and in-service training programs may be garnered from the following statements:

One of the teachers of vocational agriculture said at the conclusion of the course: "This course has done two things for me. It has brought me up-to-date in technical agricultural information and has shown me how to use all of my technical knowledge in helping farmers in farm planning."

The members of the college faculty and technical staff expressed themselves as delighted with the opportunity of working with other technicians in planning the farms. Dr. Jarmagin, of the Animal Husbandry Department, said: "I feel that this type of a course is not only excellent training for teachers of agriculture but would be equally valuable for all the seniors in the College of Agriculture. This project has brought to our attention the abilities needed by teachers of vocational agriculture, county agents, and soil technicians and will enable all of us to make our courses more functional for these men. It has helped the college staff as much as it has the people enrolled in the course."

A Few Bulletins on Conservation Education

- Conservation. Rural School Leaflet Vol. 29, No. 3. Department of Rural Education, Cornell University, Ithaca, N. Y. January 1936.
- Conservation of Florida's Wildlife Resources. Florida School Bulletin Vol. 1, No. 9. State Department of Public Instruction, Tallahassee, Fla. February 1939.
- Experimenting with Soils in the Elementary Grades. State Teachers College, Mayville, N. Dak. February 1940.
- Helps in Teaching Conservation in Wisconsin Schools. Department of Public Instruction, Madison, Wis. May 1938.
- Results of Erosion. Agricultural Education, Vol. 12, Nos. 6-9. Department of Agricultural Education, Clemson Agricultural College in cooperation with State Department of Education, Columbia, S. C. February-May 1936.
- Save the Soil. Rural School Leaflet Vol. 29, No. 4. Department of Rural Education, Cornell University, Ithaca, N. Y. March 1936.
- Saving Georgia Soils. Prepared by the Soil Conservation Service, U. S. Department of Agriculture for the Georgia Program for the Improvement of Instruction in the Public Schools. State Department of Education, Atlanta, Ga. 1938.
- Soil, Its Use and Conservation. California State Department of Education, Sacramento, Calif. September 1937.
- Soil Conservation: An Elementary Discussion for Use in Grade Schools. Extension Circular No. 376. Extension Service, South Dakota State College of Agriculture and Mechanical Arts, Brookings, S. Dak. September 1938.
- Soil Conservation Program for 4-H Clubs. Club Bulletin No. 33. Extension Division, Michigan State College, East Lansing, Mich. May 1937.
- Teaching Conservation in Wisconsin Schools. Department of Public Instruction, Madison, Wis. May 1937.
- Units in Conservation for West Virginia Public Schools. Vol. 1, Grades 1 to 8. Conservation Commission of West Virginia and State Department of Education, Charleston, W. Va. April 1939.
- Units in Conservation for West Virginia Public Schools. Vol. II, Grades 7 to 12. Conservation Commission of West Virginia and State Department of Education, Charleston, W. Va. April 1939.
- The University and Conservation of Wisconsin Waters. University of Wisconsin, Madison, Wis. November 1936.
- The University and the Erosion Problem. University of Wisconsin, Madison, Wis.

Youth and the Soil: A Unit for Schools. State Teachers College, Mayville, N. D., with the cooperation of the North Dakota State Extension Service and the Regional Office, Soil Conservation Service, Lincoln, Nebr. June 1940.

CONGRESS HEIGHTS SCHOOL ACTIVITIES—See Opposite Page.

1. A baking pan and clay were used by a sixth-grade group to make this model showing mountain formation and strata of the earth. The interest in earth formation came from a visit to a new road cut.
2. Growing on this rock were found lichens, mosses, and ferns. From the work done in classes these girls were able to read a very interesting story.
3. Samples of soil being tested for acidity, air in soil, and the feel of soil left in an open container compared with that kept in a closed container.
4. Three lamp chimneys, sand, clay, and garden soil were used by a sixth-grade group to study how rain penetrates different soils.
5. First-grade experiments with soil were the basis of this reading work. The teacher planned a series of stories and games for her class, duplicated them, and put them together in a book.

Children of Congress Heights School, Washington, D.C., study Soil Conservation.



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CHENEY LABORATORY SCHOOL

By FRANK B. HARPER¹



Most children like machinery. Martin Mickey holds their interest in explaining how implements on his farm till the soil in such a way as to leave a cover of straw and stubble for protection of the field from wind and water erosion.

THE study of the soil, its waste and conservation—land use—was added to the curriculum of the Eastern Washington College of Education laboratory school at Cheney for the first time last year. It came about when Dr. Otis Freeman, head, department of science, suggested to Director Clark M. Frasier and the laboratory school staff that resource teaching be developed in connection with regular class work. They did so and obtained technical and teacher-aid material from the Soil Conservation Service through its Region 9 office at Spokane, 17 miles away.

A definite project for the 1939-40 school year promptly was set up, with the conservation subjects added to the curricula of the first six grades as part of the pupils' home relation work. The task was not at all difficult; it was found that the study of soil followed logically in subject matter already taught. For example, the first-graders' nature study suggested the dependence of the birds, flowers, and trees upon the soil. The second-graders had been studying about food and clothing; it was but a short step to tie up the origins of these essentials in the soil. In the third

grade, shelter as the base subject carried smoothly over into houses, trees, and forests, and the soil from which trees grow.

From the picture scrapbooks, made up by the little folks, to the popular and even technical bulletins on soil conservation read by the older pupils, soil conservation was found to fit naturally into the laboratory school courses all along the line. New subjects were at hand for coloring and painting, furrows and contour crop strips to reproduce in the art room with crayon and brush, new words for vocabulary studies—erosion, contour, trashy fallow, and so on. A large water-color mural on soil conservation, painted as a class project by fourth-grade pupils, was an outstanding school production of the year.

Grass clumps and soil samples, studied with great interest in the schoolroom, were made to mean more on the field trips arranged that children might see how grass roots bind the soil and how soil washes and blows away when it has no roots to hold it. Out on the farm, the pupils saw gullies, and fields tilled with the slope and across it. Back in the schoolroom, they wrote about what they saw, drew pictures, and built simple models of the "right" and "wrong" way of farming.

Cheney is at the eastern end of what is known as the Big Bend country, one of the major wheat-growing areas of the Pacific Northwest. The laboratory school's pupils come from the farms and ranches of the area, as well as from the families of townspeople depending upon the Big Bend's agricultural bounties. Director Frasier knows that within a few years these young people will be doing the farming themselves, or will be carrying on business with their former schoolmates who are raising the wheat and the cattle and sheep. Many of tomorrow's Big Bend men and women will know about soil erosion and how to prevent the losses of unwise land use.

Approximately 300 pupils studied about soil conservation last year, and carried many of the lessons they learned back home to their parents and acquaintances.

The city schools of Memphis, Tenn., are proving that even among city children a knowledge and appreciation of conservation problems and a more desirable attitude toward these problems can be created.

¹ Regional division of information, Pacific Northwest Region, Soil Conservation Service, Spokane, Wash.



Much destructive water comes down from the upper field, when potato rows continue to be run down the slope. This farm near Presque Isle, Maine, has been used for decades, principally for the production of potatoes. The soil has been thinned down so much that bedrock is exposed in many of the washes that have dissected it. Terrace channels had to be blasted through rock in many places to get adequate depth.

THIRTY YEARS OF VERTICAL FARMING

BY H. H. BENNETT ¹

SOME thirty years ago, I went into northern Maine on a hunting expedition. To be precise, it was 32 years ago and the hunting was of a technical nature—the searching out of the soil characteristics in the Aroostook potato district, the classification of the soils occurring in that part of the United States, and an appraisal of their productivity and agricultural adaptation.

By horse-and-buggy we explored back and forth through the 339,200 acres of land covered by the soil survey of the "Caribou Area,"² lying in northeastern Aroostook County. We dug into the soils of fields, meadows, forests, and muck bogs; we measured the depth of the material and recorded the characteristics of the different layers occurring at different levels through the profile. Twelve soil types were mapped. The most important one was that ideal potato soil, the Caribou loam—220,000 acres of which were found within the area surveyed. The upland soils, formed of glacial material, largely of limestone origin, were found to be for the most part splendidly adapted to potatoes, as well as to clover, grass, oats, and other crops amenable to the climatic vicissitudes of 46°20' north latitude.

¹ Chief, Soil Conservation Service, Washington, D. C.

² Published by the Department of Agriculture, 1910.

At that time much of the cultivated land was newly cleared of its rich forest cover; nearly all of it was new land. The content of organic matter was high, and the better cropland such as the Caribou loam was deep, mellow, and highly productive. An important agriculture had been established—this Aroostook area represented then as it does now one of the most important potato producing districts of the Nation. Excellent yields were being produced; but even then farmers here and there were getting away from some of the fundamentals of the older agriculture which included such activities as dairying, the production of beef and mutton, and the growing of clover and timothy. Large quantities of timothy hay were shipped to Boston. The change that was setting in at that time was in the direction of more potatoes and less grass—and, incidentally, more erosion and



Erosion on Presque Isle farm where buckwheat was used as a green manure crop. Deposits of coarse material cover good land along the lower slope. The rich, fine soil has floated along toward the Atlantic.

less potatoes per acre on too many acres, with no potatoes on some acres.

What I particularly want to stress now, however, is the fact that in this Maine area we found, nearly a third of a century ago, productive land that did not show enough erosion to arouse any suspicion of its importance as a farm problem. Certainly, there were no gullies and in the average field sheet erosion had not proceeded far enough to expose the lighter-colored, yellow subsoil. In general, agriculture was flourishing. On the farm, the past—part of it at any rate—had been very good; the present was prosperous; the future looked rosy. But even then man was bending nature's way of doing things—thoughtlessly, but none-the-less violently. Nature had established no straight-line, downhill waterways for disposing of surplus rainfall and melting snow. The streams that nature had built followed winding courses by moderate gradients; the virgin land was covered with vegetation so as to distribute rainfall evenly over the surface of the ground and otherwise prevent its rapid run-off.

At that time physicists knew about a number of laws that nature had set up governing the flow of water. It was known, for example, that water would not flow uphill, that it flows faster as the volume within an open channel increases, and that the faster it flows the greater the load of material,

such as productive topsoil, it can carry away in suspension. And so, even good farmers, who practiced good crop rotations and employed other scientific methods of farming, openly and unknowingly violated the laws of gravity and hydraulics, and forthwith ran their potato rows and all other kinds of rows straight down the hill.

On this second trip, in September 1940, good potatoes—great quantities of them—were still being grown in the Aroostook district, but unfortunately, the farmers were expecting low prices for the year's crop. I learned of predictions of prices so low as not to pay the cost of production.

There had been an unfavorable change in the price of potatoes since my first visit. I was told that this change was an economic change, and I could find no argument with that view. Thirty cents or less for a whole bushel of beautiful Aroostook County potatoes, as some feared the price might be, was not much, certainly.

I had heard before arriving that the land had undergone certain "physical" changes, especially the washing off of the mellow topsoil to stiffer subsoil which was less retentive of rainfall, more difficult to plow, and less productive. But I hadn't counted on any such prodigious change in the soil as I actually found—change caused by erosion. And let it be added here as specifically as possible that the general result of this physical

effect of erosion was having a critical economic effect on farmers by way of such unfavorable economic items as reduced productivity of the soil, increased cost of filling gullies so that "farm machinery can get across the ditches," abandonment of fields in which the soil had become too stony (as the result of the assorting effect of erosion) or too shallow for cultivation, etc., etc.

Still I found that some things had not changed. Most of the steep cultivated slopes had yellow subsoil at the surface or near the surface; some of them showed gullies—one a short distance north of Presque Isle was 10 feet deep and it might have been deeper but for the fact that it had cut down to solid rock. The exposed subsoil, the reduced



Little erosion can take place in this Aroostook County potato field so long as the ground is covered with clover and grain stubble like this. Where potatoes are grown on sloping land, they should be on the contour with strips of protective crops between, or terraces where needed. Rotations should include soil-building and soil-holding crops like clover, alfalfa, and grass.



Soil erosion, spring of 1936, caused by melting snow. Aroostook County, Maine.

content of soil humus, had increased erodibility of the land and the tendency of the soil to bake. Some fields abandoned to grass contained very little grass; there were more weeds than grass, and the soil was dry and hard and resistant to penetration by rainfall. There was a tone of uncertainty about the farm outlook on the part of some of the local people with whom I talked. It was costing a lot of money to grow potatoes, I was told. "Our land is not all as good as it used to be." Another observed: "You know one of our oldest and reputedly best farmers found out only this year that one of his best potato fields is suffering severely from erosion. He thinks all the washing resulted from this year's rains, but, of course, it is the accumulated result of 30 years of cultivation, most of the time to potatoes."

I was going to point out some of the things that had not changed across the interval of a third of a century between my trips to this part of Maine. One thing that hadn't changed was the direction of potato rows. Most of them, except on farms that had cooperated in the Soil Conservation Service demonstration project, still ran straight down the hill. The natural law with respect to the scouring capacity of water flowing in open channels downhill—I mean, in this instance, the furrows between potato rows—had not changed, nor had it been amended in any particular. The effects were distressing, even those caused by the rains and melting

(Continued on page 122)



TRAINING
FOR THE PRESENT
AND THE FUTURE

